

AD-A082 222 GENERAL ACCOUNTING OFFICE WASHINGTON DC PROCUREMENT --ETC F/G 17/2
THE JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM--HOW IMPORTA--ETC(U)
JAN 80
UNCLASSIFIED GAO/PSAD-80-22 NL

1 OF 1
AD
AD-82222



END
DATE
FILMED
4-80
DTIC

LEVEL #

BY THE COMPTROLLER GENERAL

Report To The Congress OF THE UNITED STATES

ADA 082222

The Joint Tactical Information Distribution System-- How Important Is It?

(cont. Apr 3) JTIDS

The Joint Tactical Information Distribution System is being designed to counter the existing electronic countermeasures threat to U.S. communications by Warsaw Pact forces. Development of the system has been given a high priority, but management has been ineffective and progress slow. *GAO has have*

Problems similar to ones cited in a February 1979 GAO report continue to exist, and recent actions by the Office of the Secretary of Defense and the Air Force to reduce its cost effectiveness and military worth raise questions as to whether the need for the system is as critical as indicated by the Department of Defense.

11 30 10x180
12 46

DTIC
SELECTED
MAR 25 1980

A

DDC FILE COPY



DISTRIBUTION STATEMENT A
Approved for public release;
Distribution Unlimited

14
GAO/PSAD-85-22
JANUARY 30, 1980

80 1 31 042

411 481

1/3



COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

B-196888

To the President of the Senate and the
Speaker of the House of Representatives

This report presents our views on the major issues concerning the discrepancy between the sense of urgency engendered by the crucial need for and the high priority of the Joint Tactical Information Distribution System and the continued ineffective progress and management of the program to date. Agency officials associated with the program reviewed a draft of this report, and their comments have been incorporated as appropriate.

For the past several years, we have reported annually to the Congress on the status of selected major weapon systems. This report is one in a series that is being furnished to the Congress for its use in reviewing fiscal year 1981 requests for funds.

We are sending copies of this report to the Director, Office of Management and Budget, and the Secretary of Defense.

Lewis B. Stacks
Comptroller General
of the United States

Letter on file

A

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

THE JOINT TACTICAL INFORMATION
DISTRIBUTION SYSTEM--HOW
IMPORTANT IS IT?

D I G E S T

The slow progress and ineffective management of the program to develop the Joint Tactical Information Distribution System and recent actions by the Office of the Secretary of Defense raise questions about the crucial need for and high priority of the System.

Currently, most U.S. military communications are neither secure nor jam resistant. The Office of the Secretary of Defense believes U.S. forces may not be able to operate effectively for an extended period in a hostile environment where electronic countermeasures are present. The new system will provide a secure, digital, jam-resistant communications capability.

The System, which has estimated life-cycle costs of \$7 billion, will transmit and receive data between users equipped with terminals in surveillance, antisubmarine warfare, attack and fighter aircraft, ground centers and command posts, and naval surface ships and submarines. Both the Air Force Tactical Air Command and the Navy believe the need for the System is of high priority. (See pp. 2, 4, and 18.)

In a February 1979 report, 1/ GAO identified a number of issues adversely affecting the program, including ineffective program management and direction, differences between the Air Force and Navy on the technical approach to be followed, lack of an analysis to determine the System's vulnerability to enemy jamming, and incomplete operational testing. (See pp. 6 and 7.)

1/"An Assessment of the Joint Tactical Information Distribution System," PSAD-79-39, Feb. 28, 1979.

PSAD-80-22

The Office of the Secretary of Defense has resolved some of these issues, but similar problems continue to adversely affect system development. For example:

- The System's vulnerability to the threat has not been adequately analyzed. (See p. 7.)
- Operational testing is still limited. (See pp. 7 and 8.)
- Service requirements have not been firmly established. (See p. 8.)
- Air Force and Navy technology differences have not been resolved. (See pp. 8 and 9.)
- A full Defense System Acquisition Review Council meeting has again been postponed until June 1980. (See p. 9.)
- Key Joint Program Office personnel continue to change. (See p. 10.)
- Potential integration problems continue. (See pp. 10 and 11.)
- Since the System is not being reported on Selected Acquisition Reports, the Congress has a limited view of its progress. (See p. 11.)

Because of program uncertainties, the services have not been able to develop reliable data on program cost, schedule, or performance. In addition, the life-cycle cost estimate of \$7 billion is questionable because it was developed using dissimilar technology and pricing methods for the Air Force and Navy. Schedule milestones have not been formally established; and although class 1 terminals were operationally tested, the tests were severely limited. (See p. 18.)

Since GAO's previous report was issued, a number of events have occurred which caused doubts about the high priority and crucial need for the system.

- The Office of the Secretary of Defense only recently began a study to determine the System's cost effectiveness and military worth. (See p. 12.)
- Officials of the Secretary's Office testified before the Congress that the services could not afford the System and began a cost-reduction study. (See p. 12.)
- The Air Force withdrew all class 2 fighter aircraft terminal development funds from its fiscal year 1981 budget support documents on the basis that it could not afford the System. (See p. 12.)
- The Secretary's Office has completely re-directed the program, in effect, deferring most major decisions until June 1980, at the earliest. (See p. 12.)

GAO believes that the latest program revision deferring major program decisions until June 1980 is a sound management decision because it aligns the program with the prescribed acquisition process. However, GAO cannot reconcile the actions of the Office of the Secretary with the stated high priority and crucial need for the System. (See p. 15.)

RECOMMENDATIONS

The Secretary of Defense should

- determine the need for and importance of the System;
- establish its priority in the context of the Department's overall budget requests;
- revalidate the Joint Operational Requirements to assure it includes only those characteristics necessary to meet the need; and
- resolve the existing, and the potential for, future interservice conflicts. (See p. 16.)

If the need, priority, and characteristics of the System are reconfirmed and the existing interservice conflicts resolved, the Secretary should also:

- Evaluate, because of cost concerns, the alternative of installing the System in fewer selected platforms, using pods where operationally feasible on selected aircraft instead of internal platform installation, or relying on other jam-resistant communications equipment to satisfy the military's needs. (See p. 16.)
- Require the Joint Program Office to perform a countermeasures vulnerability study. The study should consider the basic, advanced, and distributed technologies and the use of sophisticated and multiple jammers in the most threatening situation anticipated. (See p. 16.)
- Direct that the cost-effectiveness study group consider the results of the cost-reduction program which could involve significant degradation of the Joint Operational Requirements. If the group's final report does not consider these reduction efforts, the study will not be valid. (See p. 17.)
- Require the Joint Program Office to prepare a Selected Acquisition Report that would show the total System program cost. Defense officials have indicated that if such a report were prepared, it may only show research, development, and test costs--actual procurement cost would be shown in host platform reports. The officials also indicated that the cost of the digital system display or control display interface may not be included as a System acquisition cost, but as a part of aircraft modification accounts. (See p. 17.)
- Assure that designated weapon platforms can accommodate the System. Although the exact

configuration of the System is not currently known, many platforms are already approaching their space, weight, power, and cooling limitations and will not be able to provide one or more of these requirements for this System or others under development without costly modifications. (See p. 17.)

--Require that all future major program decisions are reviewed through the Defense System Acquisition Review Council/Decision Coordinating Paper process so that final program decisions are in compliance with established major system acquisition policy. (See p. 17.)

--Require the Program Office to prepare a joint program life-cycle cost estimate which would be based on a common technology, reflect the impact of inflation, and consider the cost-reduction efforts. (See p. 22.)

--Establish schedule milestone dates through the Defense System Acquisition Review Council/Decision Coordinating Paper process. (See p. 22.)

A draft of this report was reviewed by Defense officials, and their comments were incorporated as appropriate.

C o n t e n t s

		<u>Page</u>
DIGEST		i
CHAPTER		
1	INTRODUCTION	1
	System beginning	1
	System description	3
	Planned enhancements	4
	Status of foreign military sales	4
	Review objectives and scope	5
2	PROGRAM PROGRESS AND MANAGEMENT NOT REFLECTIVE OF SYSTEM NEED AND PRIORITY	6
	Management and direction continue to need improvement	6
	System need and affordability	12
	Conclusions and recommendations	15
3	COST, SCHEDULE, AND PERFORMANCE BASELINES NOT YET ESTABLISHED	18
	Cost	18
	Schedule	19
	Performance	20
	Conclusions and recommendations	21
APPENDIX		
I	Joint Tactical Information Distribution System chronology	23
II	Air Force concept of communications	26
III	Navy concept of communications	27
IV	OSD reply to our prior report	28
V	Our evaluation of response	30
VI	OSD memorandum dated August 2, 1979, redirecting the program	34

ABBREVIATIONS

ASIT	adaptable surface interface terminal
DCP	Decision Coordinating Paper
DOD	Department of Defense
DSARC	Defense System Acquisition Review Council
GAO	General Accounting Office
NATO	North Atlantic Treaty Organization
OSD	Office of the Secretary of Defense
SAR	Selected Acquisition Report
TDMA	time division multiple access

CHAPTER 1

INTRODUCTION

The Joint Tactical Information Distribution System--hereafter referred to as the System--is intended to provide real-time digital data to the U.S. military services and North Atlantic Treaty Organization (NATO) forces. It is being designed to counter the existing electronic countermeasures threat of Warsaw Pact forces.

SYSTEM BEGINNING

During the early 1970s, the Air Force and Navy were separately developing similar communication systems using time division multiple access (TDMA) technologies which allocate specified time slots of a constant duration to users for transmission of messages. (See app. I.) These programs were combined by the direction of the Office of the Secretary of Defense (OSD) in 1974 into a joint service program for the development of a system which would meet the requirements of all the services. The Air Force was designated as lead service and, in 1975, a Joint Service Charter was issued. The System acquisition program was established in response to a critical need for jam-resistant tactical communications. The need was determined based on combat experiences in Southeast Asia and lessons learned from the Mideast war. The Department of Defense (DOD) believes that U.S. forces may not be able to operate effectively for any extended period of time in a hostile environment where electronic countermeasures are present.

Aircraft communications generally consist of information transmitted between two or more aircraft or between aircraft and ground stations. Without communications, the effectiveness of multimillion dollar weapon systems as well as the timeliness of needed information is degraded. As a result, communication links are a natural target for enemy electronic countermeasures, particularly when disrupting communications for a short time can yield an immediate advantage to the enemy.

The ability of hostile forces to jam U.S. military aircraft communications has been evident for years. Instances of jamming or interference with communications in Southeast Asia have been documented between 1969 and 1971. In addition, the Israeli Air Force reported communication jamming in the Egyptian battle area during the 1973 Mideast war. This jamming caused almost complete loss of voice capability on frequencies being jammed. Although the Israeli air

crews were able to use channel switching procedures to avoid the jamming, the Egyptians were able to quickly determine the new frequencies being used and jam them.

To overcome the enemy jamming potential, the Army is developing a jam-resistant voice radio for the frequency band used by ground forces (SINCGARS), and the Air Force is developing a jam-resistant voice radio for the band used by airborne forces (SEEK TALK). To overcome the other deficiencies as well as this jamming potential, the Joint Chiefs of Staff directed the development of the Joint Tactical Information Distribution System.

The Air Force Tactical Air Command and the Department of the Navy informed us that they consider the System to be of high priority. The initial Program Management Plan for the System, issued in June 1976, specified an orderly development in accordance with DOD instructions and Air Force Regulations. This plan called for the development of the System in two phases.

Phase I was to be made up of four terminals using the basic TDMA technology. The terminals to be developed through full-scale development were:

- Class 1--command and control terminals to be used in E-3A and other surveillance aircraft, as well as naval surface ships and submarines, and to be an integral part of the adaptable surface interface terminal.
- Class 2--antisubmarine warfare, attack and fighter aircraft terminals to be installed in aircraft such as F-14s, F-15s, and helicopters.
- Class 3--man-portable small terminals to be used in remotely piloted vehicles and by ground troops.
- Adaptable Surface Interface Terminal (ASIT)--ground center and command post terminals which would translate System messages to the language format of communication systems being used by equipments in command and control centers.

Phase II was to run concurrently with Phase I, and the Joint Program Office was to explore both the potential for growth of Phase I equipment, as well as different technologies and terminal configurations. The development of Phase II is

essential to fully satisfy Joint Operational Requirements for a line-of-sight, jam-resistant system. Phase II equipment would be interoperable with that of Phase I. These approaches are to be compared against each other to obtain the optimum solution to the operational requirements, technical risk, and cost.

There are three known System technologies--basic, advanced, and distributed--because each of these technologies is stated to have a different level of resistance to jamming. The following schedule shows the current stage of development of the various terminals being produced under contracts supervised by the Joint Program Office.

<u>Type</u>	<u>TDMA technology</u>	<u>Development status</u>
Class 1 Phase I	Basic	Full scale
Class 1 Phase II	a/Distributed	Advanced
Class 2 Phase I	Basic	Advanced
Class 2 Phase II	a/Distributed	Advanced
ASIT	Basic	Full scale
Class 3		Development deferred due to lack of support and requirements

a/See page 4, planned enhancements.

SYSTEM DESCRIPTION

The Joint Tactical Information Distribution System is a spread spectrum, frequency hopping communication system which will distribute secure, jam-resistant, digital information over a wide frequency band. Only System-equipped users will have access to this information and the numbers of users can range from two up to a few thousand. The System is planned to be interoperable with command and control systems used by the U.S. military services and NATO forces. A graphic presentation of the Air Force's and the Navy's concept of communications is set out in appendixes II and III.

The System presently is made up of two classes of terminals and a ground translator. Each terminal will be made up of an antenna, a transmitter/receiver group, a signal processor, a communication processor, and a digital display for host platforms not presently equipped with a display capability. Each user can broadcast over the System, and, when

not transmitting, have simultaneous access to the data being supplied by other System-equipped users. The System will use the basic technology in the transmission and receipt of messages. Most of these messages will be of a standard format; however, unformatted messages--teletype or voice messages which do not conform to a standard pattern--may be transmitted.

PLANNED ENHANCEMENTS

Planned program enhancements are to provide increased capabilities and message capacity, but will require the use of a different technology, such as advanced or distributed TDMA, rather than the basic technology. The advanced technology has normal time slots but provides for packing added data into the time period that can double or quadruple the data capacity. Also, the time slots can be halved and still maintain the basic message information which results in an increase in the number of users. The advanced technology is a half-duplex system; a terminal can either transmit or receive during any time slot interval. The distributed technology uses the same waveform and symbol structure as the basic technology, but it permits simultaneous broadcast and receipt of more than one message.

The Joint Program Office at the Air Force's Electronic Systems Division, Hanscom Air Force Base, Massachusetts, is responsible for the development and procurement of the System equipment. Through fiscal year 1979, the services have committed about \$250 million in development funds on the System. The life-cycle cost estimate for the program is about \$7 billion, of which \$4 billion is acquisition cost and \$800 million is research and development cost.

STATUS OF FOREIGN MILITARY SALES

In 1976, DOD proposed that members of NATO adopt the Joint Tactical Information Distribution System for NATO use. In return, the U.S. Government offered to make available System specifications, design data, and manufacturing processes and to waive any portion of the research and development costs and royalty fees.

Although it is still in the development stage and is not expected to enter production and operational use for several years, several countries have indicated an interest in the System. The United Kingdom has purchased nine terminals for testing purposes. The memorandum of agreement was signed on January 22, 1979. In addition to allowing

the purchase of up to 12 System terminals, the agreement provided that the United Kingdom would

- support the System concept in NATO,
- obtain prior American permission to sell System equipment to third countries, and
- bear the cost of purchased System terminals.

In addition, both countries agreed to establish program liaison offices, allow access to technical information, join in efforts to obtain national and NATO-wide frequency clearance for the System, afford a degree of security for information received equal to that assigned by the originating government, and reduce where possible taxes and custom duties for System-related goods or equipment.

REVIEW OBJECTIVES AND SCOPE

This is our second review of the Joint Tactical Information Distribution System and our objectives were to update the cost, schedule, and performance data and reassess the effectiveness of program management including actions taken in response to recommendations made in our prior report.

We performed work at the Joint Program Office and the E-3A Program Office, Bedford, Massachusetts, and the A-10, F-15, and F-16 Program Offices at Wright-Patterson Air Force Base, Dayton, Ohio. We also interviewed officials within OSD and military services headquarters in Washington, D.C.; the Electronic Systems Division, Bedford, Massachusetts; and the Aeronautical Systems Division, Dayton, Ohio.

CHAPTER 2

PROGRAM PROGRESS AND MANAGEMENT NOT

REFLECTIVE OF SYSTEM NEED AND PRIORITY

Although DOD has indicated that the Joint Tactical Information Distribution System is a high-priority system required by U.S. and NATO forces to operate effectively in a hostile environment, program progress and management have not reflected a similar sense of urgency. In our prior report, we noted, for example, that program direction and management had not been effective, that the Air Force and Navy differed on the technical approach to be followed, that the System had not been completely analyzed to determine its vulnerability to enemy jamming activity, and that operational testing of the command and control terminal in the E-3A was incomplete.

While OSD's response to our February 1979 (see app. IV) report resolved some of the problems, we noted that others continue to adversely affect the System's development program. Further, many of the intervening actions of the program participants have caused us to become even more concerned regarding the validity of the stated crucial need and the high priority of the System.

MANAGEMENT AND DIRECTION CONTINUE TO NEED IMPROVEMENT

In our initial report to the Congress in February 1979, we noted that the vulnerability of the System to the threat had not yet been adequately analyzed, that operational testing was limited, and that program management and direction had not been effective. (See app. V.)

The situation remains basically the same today because:

- Service requirements have not yet been firmly established.
- The Air Force and Navy differed on the technical approach to be followed and, while the dispute has been deferred, it has not been resolved.
- A scheduled Defense System Acquisition Review Council (DSARC) meeting has again been postponed this time until June 1980 at the earliest.

- Key Joint Program Office personnel continue to change.
- Potential integration problems continue to be a concern.
- System visibility to the Congress remains limited.

These problems are discussed below.

Threat assessment

In anticipation of a September 1979 scheduled DSARC, subsequently rescheduled to June 1980, the Joint Program Office requested an update and validation of the threat. The request stated that the range of threat to be considered should include the most sophisticated types of jamming equipment that may be deployed for several decades. Also, in July 1978, the Air Force test center requested the Vought Corporation to study the worst European situation and consider the use of sophisticated and multiple jammers. Although these studies will go far in treating our prior year recommendations, a separate assessment and validation should be made for each of the three known System technologies--basic, advanced, and distributed--because each of these technologies is stated to have a different level of resistance to jamming, and one is scheduled to be selected for production hardware at another DSARC planned for March 1981.

Although the Joint Program Office is studying the use of nulling antennas as one method to increase the System's jam resistance, there appears to be a conflict relating to the affordability of this hardware. This antenna may require additional components for each aircraft and add to the System's cost. At the present time, the Air Force and DOD are concerned about the present estimated cost and are studying ways to reduce it. If modifications are made to increase resistance to jamming, System costs will increase which will further aggravate the cost problem. Cost-reduction analysis may recommend less System capability which, in turn, will affect operational performance and military worth.

Testing

OSD informed us that the production configuration of the class 1 terminal will have the identical form, fit, and function as the terminal that was tested. Actually, the

production configuration terminal will be smaller, weigh less, have fewer parts, and have a different computer with a much larger capacity which is needed for the required relative navigation capability. The new terminal will also have a voice capability which, along with the relative navigation function, was not demonstrated in the tested terminal. DOD did not address our prior year report conclusion on the severe test limitations concerning how and where the tests were conducted, but did note that additional testing is planned in 1981 involving class 1 and class 2 terminals. There was no comment on whether the test limitations would be addressed.

Service requirements have not yet been firmly established

Although the System has been in the development stage since early 1970 (see app. I) and the Joint Program Office has been chartered for almost 5 years, the number of terminals ultimately to be acquired has not been determined. Without that information, program cost cannot be adequately computed, cost visibility cannot be supplied to the Congress, and cost impact on other systems cannot be determined.

As noted in our prior report, the Navy, Marines, and Air Force developed potential requirements--323 class 1 command and control terminals, 5,816 class 2 aircraft terminals, and 750 class 3 man-portable terminals--which were estimated to cost from \$3 billion to \$4 billion. Subsequently, the Army developed its potential requirements consisting of 29 command and control terminals and 667 aircraft terminals for use in ground command centers at a cost of about \$400 million. The total estimated life-cycle cost, however, has increased to \$7 billion--a \$3-billion increase chiefly attributed to the Air Force's addition of inflation for the support costs in the program outyears. This estimate could again change substantially, since none of the requirements are firm. (See ch. 3.)

Air Force and Navy technology differences deferred but not resolved

The Air Force/Navy differences arose after DOD directed, in September 1978, that the advanced technology would be used in fighter aircraft terminals. This type of a decision usually follows a DSARC milestone meeting where the results of testing on an advanced development model item are considered by the Council members. In this instance, however,

there was no DSARC milestone meeting, no test results to consider, nor even any advanced technology hardware. This, together with the belief by the Navy that the advanced technology would not suit its operational concept (see app. III), caused the Navy to initiate an appeal process which lasted until this decision was reversed by DOD on August 2, 1979. The latest decision stated that there would be two DSARC milestone meetings and that until the second one, planned for March 1981 at which time a decision would be made on the technology to be used in production terminals, the basic technology would continue to be used. The services had originally agreed to this in the initial Program Management Plan of June 1976. Although the August 1979 decision deferred the conflict, it has not been resolved. This resolution will not be made until the March 1981 DSARC milestone meeting. However, if the technology decision is not based on test results of existing hardware, the conflict may rise again.

DSARC meeting postponed

DSARC meetings are usually held at specific milestones in the acquisition cycle of a major weapon system, so that program progress and accomplishments can be evaluated. This is done to prevent the commitment of large sums of money to systems which may not have been adequately developed or tested. Such meetings differ from program reviews, in that the latter do not involve major program decisions. At a program review, the current status of the program is presented to the DSARC principals so that program guidance can be obtained.

A DSARC meeting was scheduled to be held in September or October 1979, and this meeting was postponed by OSD until June 1980. This postponement was the result of the August 1979 redirection, but unlike the OSD memorandum of September 5, 1978, this direction recognized the need for two DSARC meetings and directed that decisions would be made for the production technology as a result of these meetings.

The August 1979 memorandum not only resolved a number of conflicting issues, but also redirected the program back into acceptable methods of System acquisition and postponed the making of most major program decisions until sometime after June 1980. The delay in making such important decisions conflicts with the stated importance and need of this program and will increase the length of the System acquisition process.

Key joint office personnel
continue to change

During this review, we found that the turnover of key personnel was continuing. Among the changes we believe most important were those which occurred in the positions of the Army and Air Force deputy program managers and the Air Force chiefs of the Projects Division, Engineering Division, Configuration Management Division, and Business Management Division.

Standing alone such personnel changes would not cause us concern. However, by virtue of the System's stated high priority as a command and control system, crucial need, and technical complexity, coupled with the management and direction experienced to date, we feel that a high turnover rate of key personnel significantly detracts from a sense of development urgency and raises questions regarding the validity of the System's stated need and importance.

Potential integration problems
continue to be a concern

Although the System will reportedly enhance the operational capabilities of Air Force aircraft and Navy ships and aircraft, certain costly problems will have to be overcome before it can be installed. Some of the selected user aircraft are already approaching their space, weight, power, and cooling limitations and modifications to the aircraft or equipment trade-offs will have to be made if the System is to be used.

Our prior report identified a few of the potential problems that the Air Force would have in integrating class 2 terminals in the F-15 and F-16 fighter aircraft. The F-15 had inadequate cooling capacity and the F-16 had insufficient space. The Air Force is presently funding contractors to study the integration of the Systems into the F-15 and F-16 aircraft.

During this review, we found that integration reports indicated that the Navy was facing similar problems. Integration of the System in the P-3C would significantly degrade the aircraft's data processing and environmental control systems as well as its avionics payload capability. The forced air cooling system would also have to be modified at substantial cost. Further, at the present time, the E-2C

does not have sufficient power or cooling capacity to accommodate the System and is currently operating above the designed weight limits. In the case of the Navy's F-14A, addition of the System is dependent on modification of the cooling system and the removal of some existing navigation and identification equipment and radios.

The Navy noted that integration efforts are addressing cooling modifications and equipment removals for the P-3C, E-2C, and F-14 to accommodate the System and general avionics upgrades. In addition, power modifications are being addressed in the E-2C.

System visibility still limited

OSD concurred with our recommendation that the System should be included in the Selected Acquisition Report (SAR) system and steps would be taken to implement this action. The SAR system provides System visibility such as cost, schedule, and performance to the Congress in the form of quarterly reports. The first SAR was to be issued as of June 30, 1979, but because of program uncertainties and program redirection, a report to the Congress has not yet been issued as planned. Plans are currently being made to hold a DSARC IIA meeting in June 1980, and the first SAR will probably not be issued until after the DSARC recommendations are made.

We were informed that the SAR, when issued, would not reflect the procurement cost of the terminals because this cost would be included in the SAR of the host platform(s). Also, some thought was being given to including the System's digital display cost in an aircraft modification account rather than the acquisition account where it belongs. Although the total cost would remain the same regardless of the number of accounts used, it would not show the total System's cost. It is estimated that if this type of reporting on the digital display is allowed, the System's cost could be reduced by as much as 20 percent.

Fragmented funding

Each of the four services provide funds for the System under different program elements. In addition, the Navy has initiated an exploratory development effort which is expected to result in an advanced development antenna design for possible application to meet System requirements among others. If this development is successful in gaining an antenna suitable for the System, the cost of advanced development and

beyond should be included in the System cost. Also, the Air Force spent about \$56 million for development of terminals as part of the E-3A aircraft program and plans to request production funds starting in fiscal year 1980. These costs are included in the E-3A SAR. If the above practices continue, acquisition costs for the System become part of the host platform cost, and the acquisition of displays are included in aircraft modification accounts, it appears that the System's total cost visibility will be limited to only the amount spent for the System's research and development by the Program Office.

SYSTEM NEED AND AFFORDABILITY

Subsequent to the issuance of our February 1979 report, a number of events occurred which raise further questions regarding the validity of the stated high priority and crucial need for the System.

- OSD directed, in May 1979, a triservice study to determine the System's cost effectiveness and military worth.
- OSD officials testified before the Congress that the services could not afford the System and began a cost-reduction study.
- The Air Force withdrew all class 2 fighter aircraft terminal development funds from its fiscal year 1981 budget support documents on the basis that it could not afford the System.
- OSD completely redirected the program and, in effect, deferred most major decisions to June 1980, at the earliest.

Cost-effectiveness studies

Although the program has been in existence for several years and some individual service studies have been made, only recently has OSD taken steps to determine the System's overall cost effectiveness and military worth.

In May 1979, OSD directed that a triservice cost-effectiveness and military worth study be performed to support a September 1979 DSARC decision for class 2 terminals. This DSARC meeting was subsequently canceled and rescheduled for June 1980, but the study report deadline of September 1979

was not changed. As of December 1979, the study report was still being drafted and not available for our review. However, we did discuss the study plan with DOD officials and were advised that:

- The study would be essentially qualitative. For example, the preliminary conclusion on the military enhancement of the System in the amphibious assault operation was that the System would satisfy the communication requirements of the Navy.
- The threat would be treated parametrically, and the study would not address the impact of the various levels of threat to the effectiveness of a given mission. Thus, the reader would be unable to determine the System's worth against various threats.
- The Air Force/Navy technology issue would not be resolved with the recommendation of a preferred technology. In particular, the ability of each technology to satisfy the operational needs, such as capacity, interoperability, navigation, and identification friend or foe, would not be addressed.
- Each service is performing its own mission analysis, which prevents the issue of interoperability and identification friend or foe from being addressed.

As we understand the above, the study's major failure will be the lack of cost analyses and the lack of trade-offs between cost and effectiveness over a range of threats. A reason for this is that the study will not examine either the System's engineering design or the cost implications for each of the technologies. This missing link is of particular concern in view of the concurrent but separate study to determine if certain System operational requirements could be reduced to realize a 20-percent acquisition cost reduction.

There are two more major issues which we believe must be addressed before DSARC IIB. These are (1) the problem of net management, particularly if relays are used to gain antijamming protection and (2) a definitive comparative assessment of the cost, effectiveness, and limitations of the three technologies under consideration for the System. We understand that the first issue is under examination, but that no examination of the second issue is planned.

Cost-reduction efforts and actions

Although the System's Joint Operational Requirements reflect the Joint Chiefs of Staff's combined judgment as to what the System should be able to accomplish to meet the stated need, OSD, because of cost concerns, began a study to determine if certain of the requirements could be reduced.

In March 1979, the Principal Deputy, Office of the Undersecretary of Defense, Research and Engineering, initiated a cost-reduction study to determine if certain System operational requirements could be reduced to realize a 20-percent acquisition cost reduction. The results of this study are to be presented to the DSARC meeting in June 1980.

In April 1979, the Principal Deputy informed members of the Subcommittee of the Committee on Appropriations of the House of Representatives that, at that time, the estimated \$5.5 billion cost for the System was too high, and if the cost could not be reduced, the services could not afford it.

In May 1979, the Air Force withdrew all class 2 fighter aircraft terminal development funds from its fiscal year 1981 budget support documents on the basis that they could not afford the System as designed. The Air Force subsequently reinstated these funds.

Another consideration by OSD to reduce program cost was to segregate the cost of the digital display from the program and treat it as a modification cost. Although the total cost to OSD would remain the same, the segregated costs would be included in more than one cost account. However, where the need for the digital display is attributable solely to the System equipment, the cost should be treated as a System cost.

Program redirection

Recently, OSD redirected the program so as to capitalize on demonstrated capabilities and on the investment to date. The memorandum to the Secretaries of each service, issued on August 2, 1979 (see app. VI), among other things, brought the program more into line with prescribed system acquisition procedures, but deferred most major decisions until June 1980 at the earliest. Specifically, this memorandum:

- Directed that the class 2 terminal would use the basic technology for the present because this technology already had conditional frequency approval for use in the United States and was important to achieve jam-resistant communications as early as possible.
- Approved the release of the class 2 terminal request for proposal to contractors after it had been revised to reflect the use of the basic technology, while at the same time including options to retain the potential to progress to the advanced or the distributed technology.
- Directed the services to plan for a DSARC IIA meeting on the class 2 terminal in February 1980 (subsequently postponed until June 1980) after the Joint Program Office had evaluated the contractor responses to the revised request for proposal.
- Directed the services to plan for a DSARC IIB meeting on the class 2 terminal by December 1980 (subsequently postponed until March 1981) to consider adoption of the advanced or distributed technology.
- Authorized the Navy to continue development and test of equipment using the distributed technology and the Air Force to continue its evaluation of the advanced technology, so as to support a decision at DSARC IIB on the future System technology.

The memorandum also cautioned the services that they should maintain awareness of such aspects as joint service and NATO interoperability, effects on allied programs and NATO deliberations, and frequency spectrum supportability (both domestic and international).

CONCLUSIONS AND RECOMMENDATIONS

Although OSD's August 2, 1979, program direction which realigned the System development program to conform with prescribed system acquisition procedures was proper and reflective of sound management, we nonetheless are disturbed with the program's progress to date. We are particularly concerned with the fact that it does not appear to coincide with the stated crucial need for and high priority of the System.

OSD has indicated that it questions the ability of U.S. tactical forces to effectively operate in a confrontation situation with the Warsaw-Pact countries without a secure, jam-resistant communication network. Accepting this proposition, it is difficult not to be disturbed by (1) the continued existence of problems similar to those noted in our prior report, (2) OSD's action in only recently beginning a study to determine whether the System is cost effective, (3) OSD's recent study to determine if the Joint Operational Requirements could be reduced, (4) the Air Force's withdrawal of development funds, and (5) the fact that OSD found it necessary to again redirect the program. In view of these actions, the question arises as to whether the stated critical need for the Joint Tactical Information Distribution System is valid.

Consequently, we recommend that the Secretary of Defense

- determine the need for and importance of the System;
- establish its priority in the context of the Department's overall budget requests;
- revalidate the Joint Operational Requirements to assure it includes only those characteristics necessary to meet the need; and
- resolve the existing and the potential for future interservice technology conflicts.

If the need, priority, and characteristics of this System are reconfirmed and the existing interservice conflicts resolved, the Secretary should:

- Evaluate, because of cost concerns, the alternative of installing the System in fewer selected platforms, using external pods where operationally feasible on selected aircraft instead of internal platform installation, or relying on other jam-resistant communications equipment to satisfy the military's needs.
- Require the Joint Program Office to perform a countermeasures vulnerability study. The study should consider the basic, advanced, and distributed technologies and the use of sophisticated and multiple jammers in the most threatening situation anticipated.

- Direct that the cost-effectiveness study group considers the results of the cost-reduction program which could involve significant degradation of the Joint Operational Requirements. If the group's final report does not consider these reduction efforts, the cost-effectiveness study will not be valid.
- Require that the System's SAR disclose the System's total cost, which includes research, test, acquisition, and modification. OSD officials have indicated that the report may only provide cost data for research, development, and test--actual procurement cost will be shown in host platform reports. The officials also indicated that the cost of the digital system display may not be included as a System acquisition, but as a part of aircraft modification accounts.
- Assure that designated weapon platforms can accommodate the Joint Tactical Information Distribution System. Although the exact configuration of the System is not currently known, many platforms are already approaching their space, weight, power, and cooling limitations and will not be able to provide one or more of these requirements for this System or others under development without costly modifications.
- Require that all future major program decisions are reviewed through the DSARC/Decision Coordinating Paper (DCP) process so that final program decisions are in compliance with established major system acquisition policies.

CHAPTER 3

COST, SCHEDULE, AND PERFORMANCE

BASELINES NOT YET ESTABLISHED

Because of the program uncertainties, the services have not been able to develop reliable data on program cost, schedule, or performance. The current total estimated cost is questionable, because it includes estimates developed on dissimilar bases and only a portion of the estimate reflected escalation. With respect to scheduling, program milestones have never been officially established and those that were set by the Air Force have continually been revised. Finally, additional testing must be accomplished to demonstrate the System's ability to meet certain performance characteristics required by the Joint Chiefs of Staff.

COST

In our prior report, we noted that although the Joint Program Office estimated the System's life-cycle cost at from \$3 billion to \$4 billion, program uncertainties and other factors affect its accuracy. By July 1979, the cost estimate increased to about \$7 billion, but this estimate is also questionable. It was not prepared by the Joint Program Office, but instead is the total of each of the services individual life-cycle cost estimates which were prepared on dissimilar bases for the Air Force and the Navy.

The Navy's estimate was based on using the distributed technology in its class 2 terminals, while the Air Force estimate was based on the use of basic and advanced technology. The Army's cost portion related to class 1 and class 2 basic technology terminals which would be used with its Position Location Reporting System equipment in ground command posts and centers, but did not include class 3 terminals planned to be used by ground forces. Prior to this time, the Army had not established any requirements for the System. The \$7 billion estimate is further questionable because the Air Force and the Army estimates included an escalation factor, while the Navy estimate is based on fiscal year 1978 dollars.

The following schedule compares the estimates of the individual services with the last estimate (April 1978) prepared by the Joint Program Office. The \$3-billion increase is chiefly attributed to Air Force's addition of inflation for the support costs in the program outyears.

	Life-cycle cost estimate	
	Program Office 4/78 (note a)	Service estimates 7/79
	----- (millions) -----	
Air Force	\$1,500 to 2,200	b/\$5,000
Navy	1,300 to 1,600	a/1,800
Army	30 to 30	b/400
Marine Corps	60 to 90	-
Total	<u>\$2,890 to 3,920</u>	<u>\$7,200</u>

a/In FY 1978 dollars.

b/In then-year (escalated) dollars.

SCHEDULE

The milestones on the System's terminals have never been officially approved through the DSARC or the DCP process. The Air Force, as lead agent for the program, has established some milestones; however, as the program evolved, these milestones had to be revised. For example, the Program Management Directives of June 1977, January 1979, and the latest amendment of October 1979 show apparent slippages. Some of the January 1979 milestones, at the time they were established, could not be met and new milestone dates were shown in the June 1979 Program Management Plan. Now, with the program redirection 1/ calling for a DSARC IIA in February 1980 (subsequently postponed until June 1980), new milestone dates were established in the October 1979 amendment to the Program Management Directive.

The System program is evolutionary in nature and the equipments are in various stages of development. This occurred because the class 1 terminal development had priority in order to achieve early installation in E-3A aircraft. Related to this effort was the development of the adaptable surface interface terminal so that E-3A aircraft could communicate with ground-based command and control centers. Despite this priority, the class 1 terminal schedule was delayed because the Government (1) changed the waveform signal

1/OSD direction of Sept. 1978 was to develop an advanced technology system; OSD redirection in Aug. 1979 was to develop a basic technology system.

to accommodate tactical air navigation and interservice frequency compatibility and (2) accepted a value-engineering change proposal submitted by the contractor for a lower cost terminal configuration different from the one already in development. As a result, the class 1 production decision scheduled for December 1977 was deferred to December 1979--a 2-year delay.

The class 2 milestones have also been revised, but for a different reason. The OSD direction of September 1978 and the subsequent redirection of August 1979, calling for a DSARC IIA on this terminal, has delayed the award of the full-scale development contract from the previous milestone of June 1979 to the currently estimated August 1980--a 14-month delay.

The class 3 terminal schedule has similarly been revised, but this is due primarily to the low priority set for this terminal and the subsequent deferral of all further development efforts.

The adaptable surface interface terminal milestones appear to be the least affected by the above program perturbations. However, this apparently was accomplished by deleting two of the translation programs which resulted in reducing the test period from 20 months to 8 months.

The DSARC IIA planned for June 1980 will be the first time that OSD will have an opportunity to officially establish milestones for the Joint Tactical Information Distribution System program through the DSARC/DCP process. Once this is accomplished, there will be a baseline from which progress or program slippage can be measured.

PERFORMANCE

The Joint Operational Requirement document, issued by the Joint Chiefs of Staff in March 1976, lists the required characteristics for Phase I basic technology terminals, such as capacity, range, relay capability, simultaneous nets, voice channels, jam resistance, and relative navigation. The only testing completed was on the E-3A advanced development model waveform B terminal in 1978. This testing demonstrated some but not all of these characteristics. As stated, this terminal was an advanced development model and was not configured to demonstrate such characteristics as the voice or the relative navigation functions. The final test report concluded that while the System-enhanced E-3A aircraft should

have a significantly improved capability to conduct and manage command and control operations, further operational testing of the System terminal will be required.

A full-scale development model of the currently configured class 1 terminal has been produced, but is not planned to be flight tested until 1981. Instead, these terminals are being supplied to the adaptable surface interface terminal contractor for incorporation in the unit, and testing in a ground environment will extend from late 1979 to about mid-1980. Also, a limited production contract will be awarded in December 1979 for class 1 terminals to be installed in E-3A aircraft.

During 1979, the Navy conducted bench, flight, and system laboratory testing of an advance development model of the class 2 terminal. Test results, however, will not be available until 1980.

CONCLUSIONS AND RECOMMENDATIONS

A current joint program cost estimate for the System has not been prepared. The estimates that are available were developed by each service on dissimilar bases--different technologies were used and inflation factors were applied by the Air Force and the Army. Further, these estimates do not reflect the latest direction to use the basic technology nor do they reflect the current cost-reduction efforts.

The schedule milestone dates have never been approved through the DSARC/DCP process. The milestones set by the Air Force in 1977 have been revised, some of those set by the Air Force in 1979 cannot be met, and some milestones will be contingent on actions taken at the two DSARC meetings in 1980-81.

Performance characteristics are set out in the Joint Operational Requirements document, and the flight testing to date has demonstrated only some of these requirements. Despite this incomplete testing, the Joint Program Office intends to award a limited production contract for class 1 terminals for installation in E-3A aircraft in December 1979.

If the need, priority, and characteristics of the System are reconfirmed and the existing interservice conflicts resolved, we recommend that the Secretary of Defense:

--Require the preparation of an accurate Joint Program Office life-cycle cost estimate for consideration by DSARC. This estimate should reflect a common technology, inflation factors, current cost-reduction efforts, and quantities of each type terminal.

--Establish schedule milestone dates through the DSARC/DCP process.

We are not recommending that the limited production contract for the System class 1 terminal for the E-3A aircraft be delayed until all operational requirements, such as voice and relative navigation functions, are flight-tested because these functions are not required for the E-3A aircraft to carry out its surveillance mission. The E-3A already has voice and navigation equipment which can be used. Further, the services have expressed an urgent need and high priority for the System.

JOINT TACTICAL INFORMATION DISTRIBUTIONSYSTEM CHRONOLOGY

1970-71 The Navy and Air Force started developing the following, which were forerunners to this System:

 Navy --Integrated Tactical Navigation System and the Integrated Tactical Air Control System.

 Air Force--Position Location and Reporting and Control of Tactical Aircraft System and the Integrated Communication, Navigation, and Identification System.

1972-73 Development testing was performed by the Navy and Air Force on the above systems.

Apr. 1973 Demonstrations of the E-3A aircraft with the Position Location and Reporting and Control of Tactical Aircraft System was conducted in Europe for the benefit of NATO countries. (Experimental SEEK BUS equipment.)

July 1974 An Air Force SEEK BUS Program Office was established to consolidate the two Air Force systems.

Sept. 1974 Consolidation of the two Navy programs and the SEEK BUS program into the System, with the Air Force designated as lead service, was directed by DOD's Director for Research and Engineering.

Jan. 1975 The Joint Service Charter for the management and administration of the System Acquisition Program was issued.

Apr. 1975 A second European demonstration of the E-3A aircraft and System-type equipment, including vans located on land and on ships, was conducted.

APPENDIX I

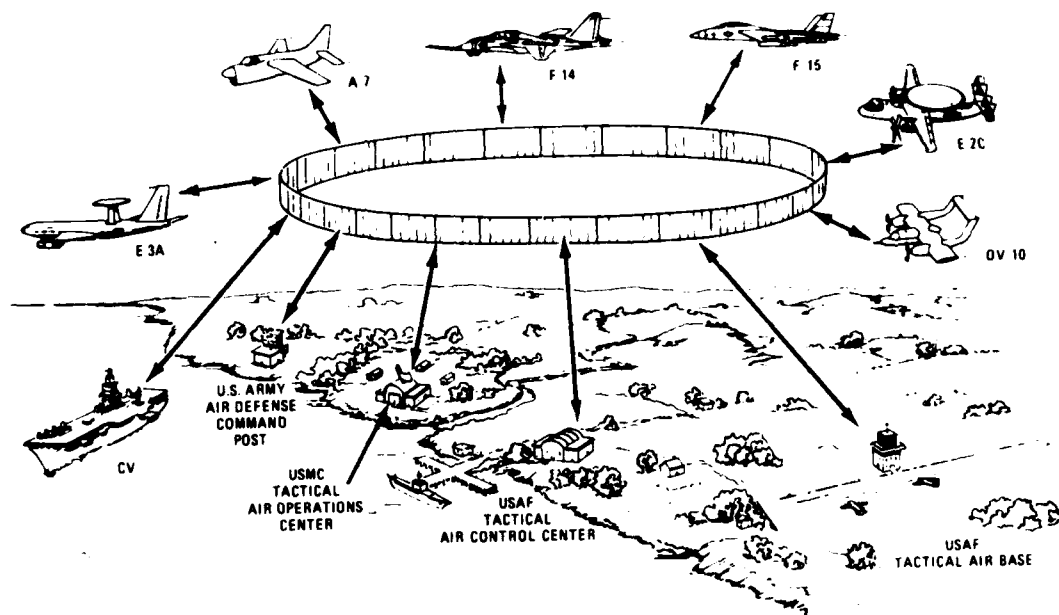
APPENDIX I

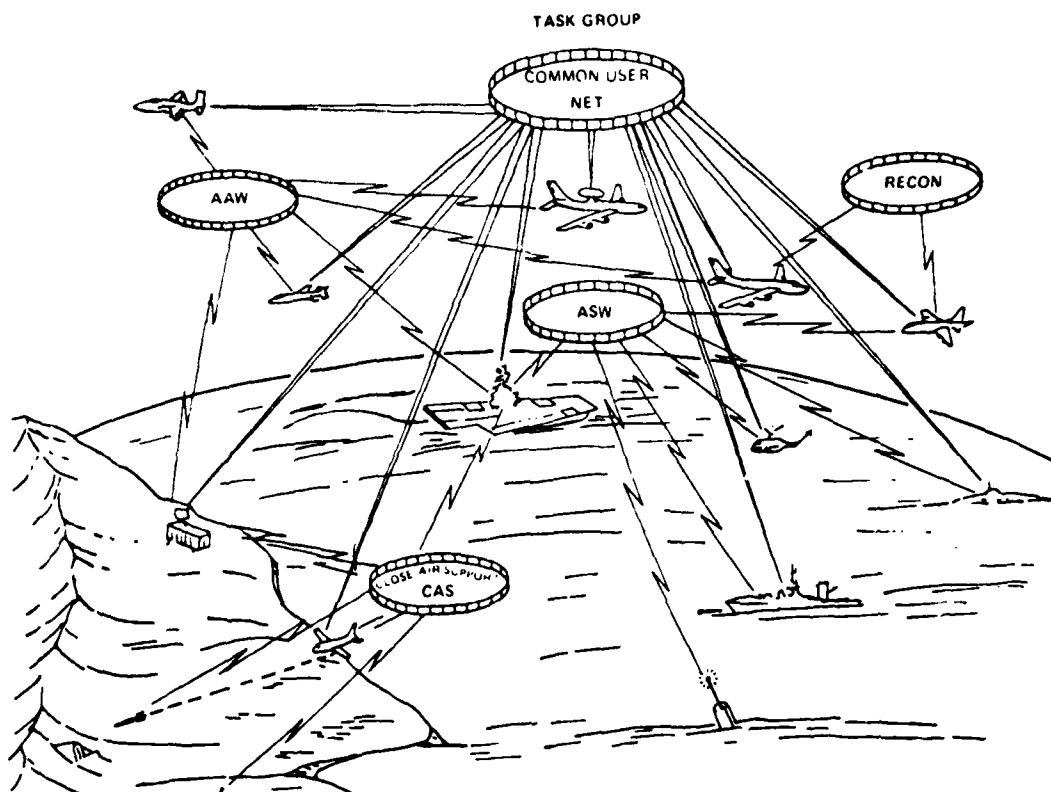
Mar. 1976	The System Joint Operational Requirements document was issued which directed the military to develop a TDMA jam-resistant secure digital data communication system.
1976	An offer was made to NATO countries by the Deputy Director for Research and Engineering to allow them to use the System plans or to purchase equipment from the United States, providing that they accept the wavelength and frequency band in which the System was to operate.
Sept. 1977	The first scheduled DSARC milestone meeting was canceled and rescheduled for April 1978.
Sept. 1977	The Boeing Company, the prime contractor for the development of the System terminals, conducted contractor tests on the class 1 waveform A terminal.
Nov. 1977	The Secretary of Defense designated the System as a major acquisition which would be subject to the DOD Directives 5000.1 and 5000.2.
Jan. 1978	A study on the vulnerability of the System was issued by the Vought Corporation, which included the identity of specific threat systems by the Defense Intelligence Agency.
Feb. 1978	NATO Technical Center bench tests of class 1, waveform B terminals were conducted in The Hague, Netherlands.
Apr. 1978	A DSARC program review was held for the purpose of furnishing program guidance, rather than deciding on program milestones.
May 1978	Combined testing was conducted by the E-3A aircraft Program Office and Air Force Test and Evaluation Center on class 1 waveform B terminals.
Sept. 1978	DOD issued a memorandum resulting from the April program review which redirected the System program.

APPENDIX I

APPENDIX I

Nov. 1978	A draft of the DCP was issued to OSD.
Mar. 1979	Executive Committee established to oversee the System's development.
May 1979	Initiation of cost-effectiveness and military worth studies.
May 1979	Air Force's deletion of class 2 development funds from fiscal year 1981 budget documents.
Aug. 1979	DOD direction on basic technology for class 2 terminals, for the present, plans for DSARC IIA in February (subsequently postponed until June 1980) and a DSARC IIB in December 1980 (subsequently postponed until March 1981).

AIR FORCE CONCEPT OF COMMUNICATIONS

NAVY CONCEPT OF COMMUNICATIONS



THE UNDER SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

RESEARCH AND
ENGINEERING

12 June 1979

Honorable Elmer B. Staats
Comptroller General
of the United States
Washington, D.C. 20548

Dear Mr. Staats:

This letter is in reply to your letter, dated 28 February 1979, to the Secretary of Defense regarding your report "An Assessment of the Joint Tactical Information Distribution System" (GAO Code PSAID-79-59, 28 February 1979, OSD Case No. 5000-23). The GAO report recommended seven actions to DoD. Each of these actions will be addressed as follows:

- a. The report recommends that DoD conduct an analysis of the threat to JTIDS assuming enemy use of multiple, sophisticated jammer deployments. On balance, we believe that JTIDS is designed to operate effectively in the validated threat environment. We, of course, intend to continuously update our threat estimates based upon the best technical intelligence data available. In addition, as our tri-Service operational concept becomes translated into specific employment concepts for JTIDS-equipped weapon systems, we will be examining each class of JTIDS terminal to ensure its design is adequate to realistically meet hostile jamming strategies and tactics. In addition, we will continue to be alert to possible changes in our tactics which, coupled with technical improvements, will maintain the ECM-ECCM initiative in favor of JTIDS.
- b. A corollary GAO recommendation relates to possible required modifications in JTIDS needed to overcome a postulated threat. As just stated, we will continue to be responsive to the changing threat picture; however, we believe that any technical modifications in the JTIDS system design should be generated on the basis of national intelligence agency estimates rather than analyses by nongovernment entities. As these modifications are defined, the Department will be pleased to discuss them in greater detail.
- c. In its third recommendation, the report recommends that DoD defer the E-3A JTIDS (Class I) terminal production decision until fighter aircraft (Class II) terminals can be demonstrated. We have carefully analyzed the technical compatibility aspects of the Class I and II waveform specifications and believe that the preponderance of

evidence significantly favors our decision to proceed with the fitting of our AWACS aircraft and supporting ground stations with the JTIDS terminal. In our view, any attendant risk of interoperability between these classes of terminals rests primarily in the software design area as opposed to hardware equipment.

d. In evaluating the AWACS JTIDS terminal initial operational test and evaluation (IOT&E), the GAO recommended additional tests to reduce observed limitations during previous tests. While we do recognize that the IOT&E results require some product improvements prior to a production decision for the AWACS JTIDS terminal, ongoing qualification tests and engineering analyses will be reviewed to determine if the results support a production decision. Value engineering efforts are expected to achieve a lower cost to produce E-3A/JTIDS terminal with the identical form, fit, and function as the one tested in the IOT&E flight program. Its flight testing is not expected to be completed until the full scale development IOT&E of the fighter terminals in 1981, but the technical risk of approving production of the E-3A/JTIDS early in FY 80 is minimal. In 1981, we expect to have a commensurably larger number of terminals for both the E-3A and fighter aircraft to satisfy your concern on the scope of the IOT&E program.

e. We concur in the GAO recommendation that JTIDS be included in the Selected Acquisition Reporting System, and we will take the necessary steps to implement this action.

f. With respect to cited differences between the Navy and Air Force regarding their preferred technologies for JTIDS implementation, we recognize the problem and have taken steps to resolve the issue at the executive level within the Department.

g. Finally, the report recommended that we evaluate the cost and feasibility of installing JTIDS pods on designated aircraft as well as evaluating the impact of the pods on mission effectiveness. This investigation has been initiated as part of an ongoing study of cost-benefit analyses for tactical aircraft.

In summary, we accept the GAO report as being of value to DoD and the Services in improving our management of the JTIDS program. We shall attempt to implement as many of the GAO recommendations as possible in the future, and in behalf of the Secretary, we welcome further comments or recommendations as appropriate.

Sincerely,

Gerald P. Dineen

Gerald P. Dineen
Principal Deputy

EVALUATION OF OSD RESPONSESTO OUR PRIOR RECOMMENDATIONS

Our report to the Congress, entitled "An Assessment of the Joint Tactical Information Distribution System" (PSR-79-39) and issued on February 28, 1979, identified a number of issues that required action. To resolve these issues, we made seven recommendations to the Secretary of Defense.

The Principal Deputy, Undersecretary of Defense, Research and Engineering, replied to our recommendations on June 12, 1979. Our assessment of the reply revealed that two of seven comments were not responsive to our recommendations and that several others raised areas of concern that should be addressed further. Our evaluation is set out below.

- OSD should conduct an analysis of the threat to the System, assuming enemy use of multiple sophisticated jammers. The reply stated that OSD believes the System is designed to operate effectively in the validated threat environment, but that it intends to continuously update the threat assessments based on the best technical intelligence data available and to be alert to possible changes in tactics to maintain the System initiative.

The reply is considered responsive. In July 1978, Vought Corporation was under contract to perform further analysis. Also, in July 1979, the Joint Program Office requested an update of the threat assessment specifying that the range of threat to be considered should include the most sophisticated types that may be deployed for several decades. However, a DSARC IIB meeting planned for March 1981 is to consider a choice between basic, advanced, and distributed technologies. We believe any new threat assessment should address the relative vulnerability of each technology before a decision is made.

- Decide on modifications needed to overcome a postulated threat and establish priorities for the implementation of these modifications. The response stated that OSD will continue to be responsive to the changing threat picture, but that it believes any technical modifications in the System design should be generated on the basis of national intelligence agency estimates rather than analyses by nongovernment entities.

The reply is considered responsive. We know that nulling antennas, one possible modification, are presently under study. However, we know there is great concern within OSD over the life-cycle cost of these terminals and that the Air Force is currently reviewing cost-reduction alternatives. With this much emphasis on cost reduction, we believe that additional costs for modifications would only compound the high-cost problem, even though the modifications may be highly effective. As a result, we believe the modifications needed to overcome the postulated threat may not be implemented.

- Defer a production decision until interoperability with fighter aircraft terminals can be demonstrated. The response stated that OSD had analyzed the compatibility of the waveform specification of the E-3A basic technology and the fighter aircraft terminals advanced technology and that as a result, the attendant risk of interoperability rests primarily in the software design area as opposed to hardware equipment.

Although the reply was considered nonresponsive, the OSD redirection of August 1979 has lessened the impact of our recommendation. However, we still believe that interoperability of terminals in a production configuration should be demonstrated before any production decision is made. The Joint Program Office plans to issue a limited production contract for class 1 terminals in December 1979, even though this terminal configuration is not scheduled to be flight-tested until September 1981.

- Direct the Air Force to conduct additional testing to reduce the limitations that were present. The response states that while OSD recognizes the test results require some product improvements prior to a production decision for the E-3A aircraft, ongoing qualification tests and engineering analyses will be reviewed to determine if the results of those tests and analyses support a production decision. OSD added that value engineering efforts are expected to achieve a lower cost for production of E-3A terminals with the identical form, fit, and function as the one tested in the flight test program.

This reply is considered nonresponsive because we were not commenting on product improvements, but

rather on limitations on how and where the tests were conducted. Product improvements cannot overcome or fix these limitations.

Also, the class 1 terminal to be procured is not the identical form, fit, and function as the terminal previously tested. The new terminal is smaller, weighs less, has fewer parts, and has a different computer with a much larger capacity. The new terminal will also have the relative navigation function and a voice capability which were not in the terminal that was previously tested and thus had not been demonstrated.

- Provide more program visibility to the Congress. The response stated that OSD concurred with the recommendation and would take the necessary steps to implement this action.

A draft SAR was prepared for issuance as of June 30, 1979, but, because of program uncertainties and the program redirection of August 2, 1979, a SAR was not issued. Because of the planned DSARC IIA milestone meeting in June 1980, the first SAR will probably not be issued until after that date.

The reply is considered responsive. However, we were informed that the SAR, when issued, would not reflect the procurement cost of the terminals because this cost should, more appropriately, be reflected in the SAR for the host platform, that is, F-14, F-15, and so forth. However, the SAR should at least identify the platforms in which the System will be installed, and if digital displays are to be procured separately, this should also be disclosed.

- Resolve the dispute existing between the Navy and the Air Force concerning the terminal technology to be used in the System. The response stated that OSD recognized the problem and took steps to resolve the issue. The response did not elaborate on what steps were taken. We know that an executive committee was established, consisting of high-level OSD and service personnel to serve as senior staff management consultants in the development, coordination, implementation, and monitoring of matters relating to the System. In addition, the Navy was allowed to continue its contract responsibilities for the phasedown of the distributed technology contract. Whether or not

these actions were an attempt to resolve the issues is not known. However, the August 2, 1979, redirection deemphasized the dispute and deferred the decision to the DSARC IIB in March 1981. Because of this redirection, the reply is considered responsive.

- Evaluate the cost and feasibility of installing pods in designated aircraft and the impact of the pods on mission effectiveness. The response stated that an investigation to do this had been initiated, as part of an ongoing study of cost-benefit analyses of tactical aircraft, but it did not further identify the study. Air Force personnel informed us that this is an Air Force internal study. The effort is low key because the whole area of pod usage has a low priority at this time. Since there is an ongoing study of pods, the reply is considered responsive.

2 AUG 1979

MEMORANDUM FOR SECRETARIES OF THE MILITARY DEPARTMENTS
CHAIRMAN OF THE JOINT CHIEFS OF STAFFSUBJECT: Joint Tactical Information Distribution System
(JTIDS)

Following the recent resolution of the JTIDS POM issue, I would like all Services to move ahead solidly with this essential program. For the near term, it is important that we capitalize on its demonstrated capabilities and our investments to date; for the longer term, we must assure that technical options and operational practices will properly serve the overall interests both of the United States and of our allies.

Accordingly, I request the following actions be taken:

- Continue Class I terminal activity and proceed with Class II Terminal activity on the basis of current Time Division Multiple Access (TDMA) architecture for the present. It is important to achieve the earliest practical ECM-resistant communications capabilities aboard Air Force air defense C3 and weapons-carrying forces, and conditional JTIDS frequency approval for TDMA has already been granted within the United States.
- The Joint Program Office is to revise the Class II Terminal Request for Proposal (RFP) to reflect a TDMA baseline (for air defense applications), but with options retaining the potential to progress to Advanced or Distributed TDMA architectures. Plan to maintain competition through full-scale engineering development and into production and stress system cost reduction and equipment commonality among architectures. The RFP may be released after revision.
- Plan for a DSARC IIA meeting by February 14, 1980. This should permit contractor responses to the RFP followed by JPO evaluation and recommendations, yet preserve schedule momentum. Plan for a DSARC IIB meeting to consider adoption of ATDMA or DTDMA by the end of 1980. The two contractor teams will be given guidance to complete the engineering development of the selected architecture to meet both Navy and Air Force needs. Also prepare to report in the DSARC IIA meeting, on specific steps taken to carry out RSI initiatives.

- Under JPO guidance, Navy continue DTDMA DT&E and Air Force continue ATDMA evaluation activities so as to support a decision on future JTIDS architecture at DSARC, IIB.
- Revise the JTIDS Decision Coordination Paper, under Air Force leadership, to conform with the above guidance and to be ready prior to the DSARC IIA meeting.

As we continue with the program, we should maintain awareness of such aspects as joint-service and NATO interoperability, effects on allied programs and NATO deliberations, and frequency spectrum supportability (both domestic and international).

I believe that this approach best reflects the overall national interest, while continuing to meet Service operational objectives.

Gerald P. Dinneen
Principal Deputy

(951508)

Single copies of GAO reports are available free of charge. Requests (except by Members of Congress) for additional quantities should be accompanied by payment of \$1.00 per copy.

Requests for single copies (without charge) should be sent to:

U.S. General Accounting Office
Distribution Section, Room 1518
441 G Street, NW.
Washington, DC 20548

Requests for multiple copies should be sent with checks or money orders to:

U.S. General Accounting Office
Distribution Section
P.O. Box 1020
Washington, DC 20013

Checks or money orders should be made payable to the U.S. General Accounting Office. NOTE: Stamps or Superintendent of Documents coupons will not be accepted.

PLEASE DO NOT SEND CASH

To expedite filling your order, use the report number and date in the lower right corner of the front cover.

GAO reports are now available on microfiche. If such copies will meet your needs, be sure to specify that you want microfiche copies.